Patent Claims

1. Process for producing a weld seam (1) in hardenable steel (2) having a material thickness (3) without secondary heating, comprising at least the following steps:

a) positioning a welding electrode (4) with respect to a weld line (5);
b) applying a voltage;
c) supplying a plasma gas (6);
d) forming an arc (7);
e) melting the steel (2) in the vicinity of the weld line (5) over the entire material thickness (3).

2. Process for joining components (13) for torque transmission in a vehicle (17) made from hardenable steel (2) and having a material thickness (3) by producing a weld seam (1) without secondary heating, comprising at least the following steps:

a) positioning a welding electrode (4) with respect to a weld line (5);
b) applying a voltage;
c) supplying a plasma gas (6);
d) forming an arc (7);
e) melting the steel (2) in the vicinity of the weld line (5) over the entire material thickness (3).

3. Process according to Claim 1 or 2, in which the hardenable steel (2) has a material thickness (3) in the range from 2.0 mm to 10.0 mm (millimetres).

4. Process according to one of the preceding claims, in which the weld seam (1) is of single-layer design.

5. Process according to one of the preceding claims, in which the weld seam (1) is designed as a butt seam or a fillet seam.

6. Process according to one of the preceding claims, in which during the welding operation a plasma jet (9) is moved in the welding direction (20) at a welding speed of at least 0.2 m/min [meters per minute].

7. Process according to one of the preceding claims, in which the weld seam (1) is produced by radial circumferential welding.

8. Join (12) between at least two components (13) for torque transmission made from hardenable steel (2), characterized in that the join (12) comprises at least one weld seam (1), produced by a process according to one of the preceding claims.

9. Join (12) according to Claim 8, characterized in that at least one of the components (13) is a hollow shaft (14) with a wall thickness (15) in the range from 2.0 mm to 10.0 mm [millimetres].

10. Join (12) according to Claim 8 or 9, characterized in that the join (12) and adjoining subregions (16) of the components (13) are designed to be free of cracks.

11. Join (12) according to one of Claims 8 to 10, characterized in that it has a ductility in the range from 250 HV to 650 HV.

12. Vehicle (17) comprising an engine (18) with a drive system (19), characterized in that the drive system (19) has components (13) for torque transmission, and at least two components (13) have been welded to one another by a process according to one of Claims 1 to 7, or in that the vehicle (17) includes a join (12) according to one of Claims 8 to 11.